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THE  
AFTER-TREATMENT  
OF CASES OF  
ABDOMINAL SECTION.  

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CHRISTOPHER MARTIN.

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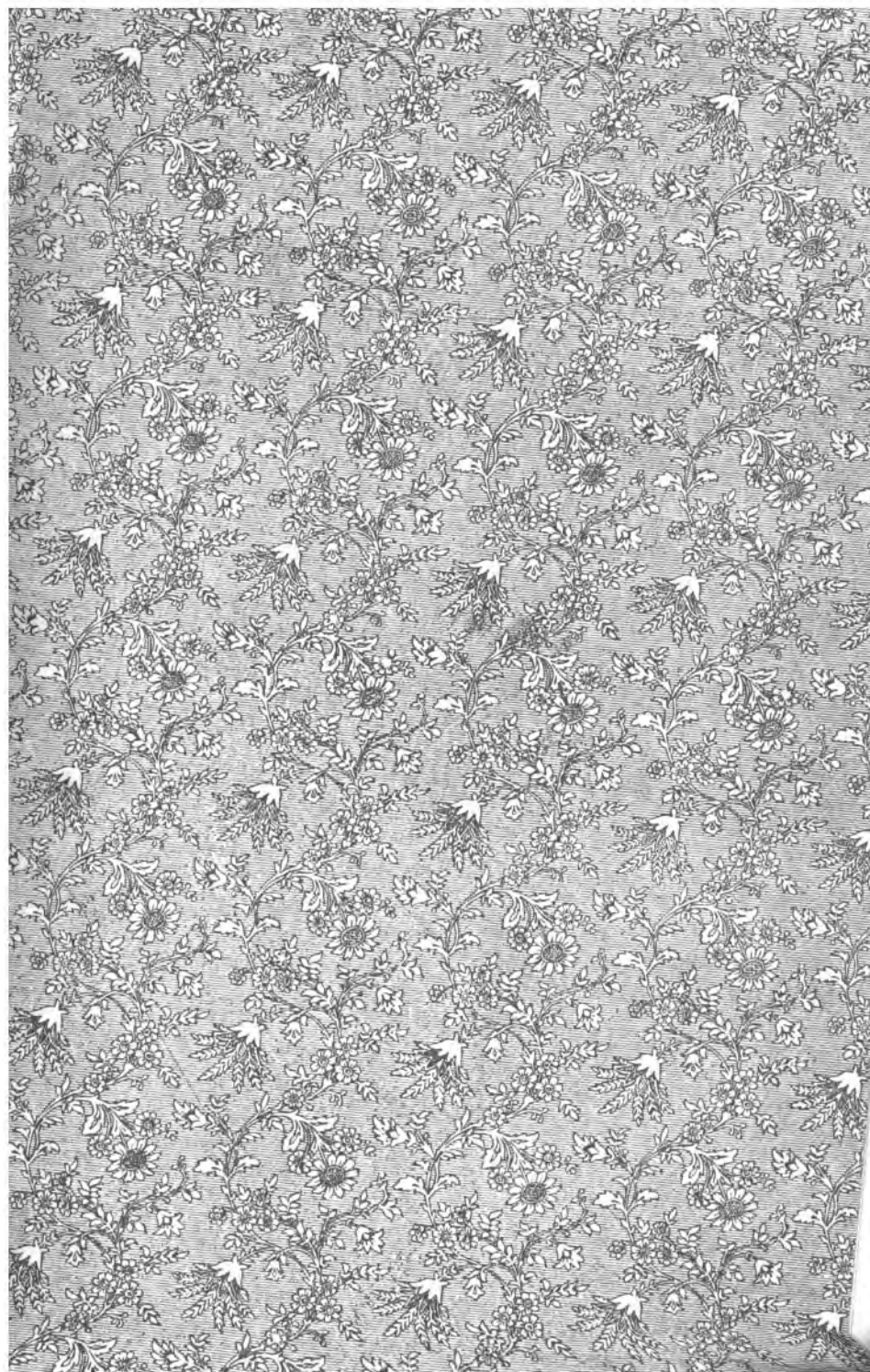
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THE  
AFTER-TREATMENT  
OF  
CASES OF  
ABDOMINAL SECTION.

BY  
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SURGEON TO THE BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN.

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## PREFACE.

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I HAVE now had under my care over one thousand abdominal sections; and in this little volume I have endeavoured to crystallize my experience of the after treatment—gained for the most part during the years when I was intimately associated with the work of Mr. Lawson Tait.

I cannot let this occasion pass without acknowledging my deep indebtedness to the teaching of that distinguished surgeon.

It will be found, however, that I have ventured to differ from him on several important points—notably as to the value of antiseptic measures.

CHRISTOPHER MARTIN.

22, BROAD STREET,

BIRMINGHAM.

*December, 1893.*





## THE AFTER-TREATMENT OF CASES OF ABDOMINAL SECTION.

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NEXT to the skilful performance of the operation, the most important factor in securing the patient's recovery is the correct management of the case after the operation, and the prompt and judicious treatment of the various complications that may arise. With the operation itself I am not now concerned ; but I propose to indicate the lines on which the after-treatment should be conducted. Other methods there are, but I shall not refer to them, believing as I do that the following is the best.

With certain exceptions, the after-treatment of all cases in which the peritoneal cavity has been opened is practically the same. In some cases, especially enterectomies and hysterectomies, there are important deviations from the routine treatment. But these exceptions are few in number, and do not affect the general principles.

Most abdominal surgeons insist on the operation being performed, whenever possible, in a special hospital—public or private—where the after-treatment is conducted by the surgeon himself and his own trained nurses. But this is not always feasible ; and not infrequently the surgeon is obliged to operate at the patient's own home, situated it may be in the heart of Wales or in some out-of-the-world village in Devonshire. The operation safely over, the surgeon departs ; and the after-treatment of the case is left in the hands of the family attendant, who perhaps has never before seen an abdominal section, and who has the vaguest notions of the complications that may arise. To such an one the following notes may be of service.

## 2 *After-Treatment of Cases of Abdominal Section.*

There are several matters which the medical attendant is expected to attend to before the arrival of the surgeon ; and as these have an important bearing on the after-progress of the case, I shall now briefly allude to them.

*The Nurse.*—Most abdominal surgeons have their own staff of nurses specially trained by them ; and they wisely insist, wherever it is possible, on one of these taking charge. In other cases the family attendant has to engage a nurse before-hand. He should choose, if possible, one who has had some previous experience of abdominal surgery. In addition to having a full knowledge of her profession, she must be young and robust, quiet and quick in her movements, firm and yet kind, scrupulously clean in her person and work, and above all, implicitly obedient to instructions.

*The Room.*—A suitable bedroom must be selected for the operation. It should be remembered that the patient and nurse after the operation will have to share the same room ; so two beds should be provided. The bed chosen for the patient's use must be small and narrow, to facilitate moving her, dressing her wound, and giving her the bed-pan. It must be provided with a firm hair mattress—a feather bed is an abomination. The room must be large, well ventilated, heated preferably by a gas fire, and situated in the quietest part of the house. There must be a good morning light. There must be no suspicion of bad drains in or near the house. But although the operation has to be performed in the patient's bedroom, care must be taken that she is not horrified by the needless introduction of the operating table or an array of surgical instruments. These must be all arranged outside the room, and not brought in until the patient is anæsthetised.

*Preparation for the Operation.*—On the previous evening an aperient should be given, and on the morning of the operation the lower bowel emptied by means of a simple soap enema. For twelve hours before the operation no food must be taken. When not otherwise contra-indicated, she should have a hot bath the night before, and in all cases on the morning of the opera-

tion the skin of the abdomen must be thoroughly cleansed with turpentine followed by the free use of soap and hot water. At the same time the nurse should wash out the vagina. The surgeon brings his own instruments, sponges, and dressings. The medical attendant, however, must provide or rig up an extempore operating table. A narrow kitchen table answers very well, or two dressing tables, placed one at right angles to the other (in the form of a letter T) may be used. At the Hospital for Women, and also in Mr. Lawson Tait's private hospital, a simple board supported on two tressels is found to answer all purposes; it is of the simplest possible construction, is easily kept clean, and is readily moved from room to room. It is to be covered with a folded blanket and over this a sheet of mackintosh. He must also see that there is a copious supply of hot and cold clean water, plenty of basins and towels, and half a dozen hot water bottles.

The patient must have on her stockings, her night-dress, and a warm bed-jacket. All being ready, the catheter is passed (and it must be absolutely certain that there is an empty bladder), the patient's denture is removed, and the anæsthetic commenced. She must be anæsthetised in her bed—not on the operating table. For the great majority of cases the best anæsthetic is a mixture of two parts of ether and one of chloroform given with Clover's inhaler. But for patients who are under fifteen or over fifty, or who have renal disease, or who are bronchitic, pure chloroform administered on a towel is preferable. The bronchitis which ether is apt to cause is a serious complication after an abdominal section, and the suspension of the functions of the kidney involved in its use renders it dangerous in renal surgery. Mr. Lawson Tait pointed out years ago that, in the human being at any rate, ether stops the secretion of urine during the period of anæsthesia. Chloroform on the other hand has no such baneful action.

*The Operation.*—As soon as the patient is unconscious, the operating table, the trays of instruments, the basins, and sponges, are brought into the room and arranged as the surgeon

#### 4 *After-Treatment of Cases of Abdominal Section.*

desires. The patient is lifted on to the table, her legs and hands secured to it with straps, her chest and legs covered with blankets and the operation proceeded with. During the operation the patient's bed must be made warm for her return by means of a row of hot-water bottles wrapped in a folded blanket. The operation over, the patient is made clean and dry, and the wound dressed. She should then be got back to bed as speedily as possible. The hot water bottles are to be moved aside, and the patient wrapped in the warmed blanket. The hot bottles are then packed around her outside the blanket. Before she awakes, the operating table, the instruments, and all the dread paraphernalia of the surgeon must be removed, and the room restored to its wonted aspect.

And now the *after-treatment* proper begins. For at least five days she must be absolutely secluded from all her friends, no one save the nurse and medical attendant being allowed to enter the room. Unless this rule be rigidly enforced, there will be endless annoyance and interference. Indeed the friends always give far more trouble than does the patient herself.

##### TREATMENT OF A SIMPLE CASE.

Let us suppose that the case is an uncomplicated ovariectomy, that the patient is young and strong, that the tumour was non-adherent and had an excellent pedicle and that no drainage tube was required. The less such a case is interfered with the better.

*The dressings*.—These should be of the simplest character. The wound is carefully dried, and may be dusted with a little powdered boric acid. A pad of absorbent ('Gamgee') tissue is laid over the wound, and secured with two strips of sticking plaster. Over all an abdominal binder is pinned. The pad is changed as soon as it becomes soiled. Such a dressing is all that is necessary until about the sixth day, when the stitches should be removed. After this the wound may be dressed with zinc ointment spread on a strip of lint.

*The Bladder*.—The nurse must take care that the bladder

does not become over distended. Should the patient be unable to pass her water—and such retention is frequent during the first forty-eight hours—the catheter must be passed about every six hours. The instrument must be scrupulously clean, and must be kept always under water when not in use, otherwise, the patient may develop a most troublesome cystitis.

*The management of the bowels.*—In the majority of cases during the first few days after an abdominal section an unusual amount of gas seems to be formed in the intestinal canal. In most cases this is passed freely per rectum and no tympanitis results. The nurse should assist the passage of flatus by means of a “flatus tube.” The best of these resembles a glass test-tube, curved slightly so to slip easily into the rectum, rounded at the end, and with a large hole on one side half an inch from the end. The tube is oiled and gently passed into the rectum, and the accumulated flatus escapes often in surprising quantities. If the patient goes on well and has no distension, no interference with the bowels is necessary until the evening of the fourth day. If they have not by this time moved spontaneously, a mild saline aperient should be given. Each morning after this an action of the bowels should be secured by means of a simple soap or glycerine enema.

*The diet.*—This is most important. For forty-eight hours after the operation she must be starved, and not allowed to swallow even a spoonful of water. She suffers cruelly from thirst; but I am convinced that this forced abstinence from fluids is very beneficial. The medical attendant must not give way to the patient's appeals. Her thirst may, however, be mitigated by allowing her to occasionally rinse out her mouth with warm water. On the morning of the third day—*i.e.*, forty-eight hours after the operation—half a tumbler of milk with an ounce of lime water may be given, to be taken in sips. At mid-day, a second half-tumbler is allowed. During the afternoon she may have some very weak tea with milk and a little dry toast. In the evening a small basin of gruel or arrowroot is given, and a tumbler of milk may be drunk during the night. On the fourth day she

## 6 *After-Treatment of Cases of Abdominal Section.*

may have, in addition to the above, tea and toast for breakfast, a basin of beef tea or chicken broth during the forenoon, and a little milk pudding about one p.m. On the fifth day fish may be given for dinner; on the sixth day, chicken; on the seventh day, meat; and on the eighth day, fruit and vegetables. Such a dietary is only to be adhered to in straightforward cases that recover without a complication.

*The Case Book.*—The nurse should be provided with a “case book,” in which she must keep a record of the progress of the patient’s symptoms. For the first twelve hours after the operation the pulse and temperature should be taken every two hours; after this every four hours until the third day, and thereafter every eight hours. She must enter each particular at the time of its occurrence and never trust to memory. She must, moreover, keep a detailed record of the patient’s diet, the administration of drugs or enemata, the passage of flatus, the movements of the bowels, the passage of urine, the presence or absence of distension, the occurrence of retching or vomiting and the character of the vomited matter, and the onset of any untoward symptom, such as severe pain, rigors, restlessness, or delirium. Should the patient begin to menstruate, the time of its onset, the amount of loss, and the time of its cessation must be noted. In cases where a drainage tube is used the nurse must record each drainage of the tube, the amount and character of the fluid removed, and the time when the tube is changed or finally dispensed with. She must also note the removal of the stitches, and the time when the patient is allowed for the first time to get out of bed.

*The Abdominal Belt.*—As soon as it is clear that the patient is out of danger—usually about the end of the first week—she must be measured for an abdominal belt. This is specially constructed to support the line of the incision and prevent the formation of a ventral hernia. It must each day be applied before she is allowed to sit up in bed. It is advisable for her to have a light belt for night wear, and a strong one for use by day.

*Sitting up.*—If the wound be soundly healed and the patient

has recovered without a complication, she may sit up in bed for an hour on the fourteenth day, and get out of bed for an hour on the fifteenth day. By about the twenty-first day she will be able to go out for a drive, or even to leave home.

*Final Instructions to the Patient.*—She must be advised as to the regulation of her diet and the management of her bowels—taking if necessary some mild aperient, such as compound liquorice powder. She must be warned to avoid all muscular exertion, such as lifting heavy weights or running up-stairs. For three months at least the marital relations must be suspended. Most important of all, she must be urged to continue the use of the belt for two years after the operation.

Certain signs and symptoms have a special significance in abdominal surgery. They are primary colours, so to speak, variously combined in the several clinical pictures. A brief separate notice of the more important may not be out of place.

#### PAIN.

This varies remarkably in different cases, and is by no means proportionate to the severity of the operation. The removal of a simple uncomplicated ovarian cyst may be followed by marked suffering. In another case, desperate adhesions to intestines, liver, and uterus have to be torn through; large areas of raw intestine have to be seared with the cautery; the pelvis has to be sponged out with perchloride of iron to arrest bleeding; and yet the patient makes an admirable recovery, scarcely suffering a twinge. Freedom from pain does not mean safety: she may be in dire peril from hæmorrhage or peritonitis. Nor must we forget the “personal equation.” The farmer’s wife, a fat, phlegmatic, honest woman, who has lived a wholesome life, suffers little and makes no complaint; whilst the pampered invalid, thin, anæmic, and neurotic, who has ruined her nervous system with morphia and chloral, tosses in agony.

This leads me to the question of morphia. To one who is not a morphia habitué, a single hypodermic injection, given immediately after the operation, is beneficial. It mercifully



## 8 *After-Treatment of Cases of Abdominal Section.*

tides her over the first few hours of anguish, lessens shock, diminishes restlessness, and checks the tendency to hæmorrhage. But the administration of the drug must not be continued, or the bowels will become locked up; and then, should peritonitis supervene, the purgative treatment, on which her salvation will depend, may prove of no avail. The habitual morphia taker is a bad subject for a grave abdominal section. The single small dose which suffices for other patients is, in her case, quite inadequate. We are on the horns of a dilemma. If we refuse, she becomes semi-maniacal, screams, and tosses violently about the bed. If we give it her in the enormous doses which she demands, and then peritonitis ensue, she will almost surely die. It must not be forgotten that in some cases, where the patient has been accustomed to huge daily doses, the drug has become almost a necessity of life, and alarming vital and mental depression may follow its sudden withdrawal. But in spite of this, I am convinced that in treating patients who are the victims of this horrible vice our best plan, in the majority of cases, is to stop all morphia abruptly and at the outset.

The pain that immediately follows such an operation as ovariectomy or removal of the uterine appendages is due to the constriction of the nerves of the pedicle by the ligature; and, as a rule, the healthier the broad ligament, the greater is the suffering. This pain seldom lasts longer than twenty-four hours.

Pain is not a marked symptom in the peritonitis following abdominal section. No doubt, in many cases, there is some degree of pain, but it is usually quite bearable. It may be entirely absent. Nor is this form of peritonitis characterised by "exquisite superficial tenderness, so that the patient screams on the slightest touch, and cannot bear even the weight of the bed-clothes."

The pain of a stitch abscess is superficial, and localised to a small area on one or other side of the wound, and is complained of during the latter half of the first week.

The pain of a broad ligament hæmatocele is deep-seated in the pelvis and back, comes on suddenly at or shortly before the menstrual period is due, and is associated with a rise of pulse and temperature. On examination, the characteristic mass is discovered.

I have seen a few cases in which, after ovariectomy or removal of the uterine appendages, the patients suffered from neuralgic pains in the nerves of the pedicle, coming and going in an erratic fashion for weeks after the operation. The patients are usually anæmic and neurotic. Tonics and a change of air are indicated, and as the patient's health improves, the pains disappear.

#### THIRST.

This is a symptom far more constant and distressing than pain. It comes on very shortly after the operation, and lasts for two or three days. In some mysterious way the mere opening of the peritoneal cavity—as in an exploratory incision—induces a terrible thirst, and this is aggravated by the forty-eight hours' enforced abstinence from fluids. Where there has been much loss of blood it is very marked. It is often asked—in what way does withholding liquids benefit the patient? Why intensify her sufferings? By so doing we diminish the risk of exciting vomiting. More important still, we diminish the risk of peritonitis. The peritoneum is its own scavenger. After an operation, blood, serum, and inflammatory products are apt to be freely poured out. If they remain, fermentative changes may ensue, and excite a fatal peritonitis. This is prevented by the peritoneum digesting and re-absorbing this dangerous material before it can do harm. We can aid this good work by the use of the drainage tube. We can aid it by withholding liquids; so that the tributaries of the portal vein, deprived of their wonted supply of fluid from the alimentary canal, absorb the more greedily any peritoneal effusion. We can also aid it by purging the patient, and thus draining the portal system. Whatever be the explanation, the clinical fact remains that patients, after abdominal sections do better and are less likely

## 10 *After-Treatment of Cases of Abdominal Section.*

to suffer from peritonitis if they be given a minimum of fluid nourishment during the first two or three days.

Ice must be shunned as poison. For the moment it is grateful, but very soon it aggravates her thirst. Too often it is made of impure water. Even when of undoubted purity it tends to disorder her stomach, excite vomiting, and even precipitate the onset of peritonitis.

But there are many cases where it would be most unwise to enforce the forty-eight-hours rule, where fluids must be given much earlier. Children and old women must not be starved longer than twenty-four hours. In patients who are exhausted, or who have lost much blood, nourishment must be commenced at once. In such cases it is best to rely on brandy and beef tea enemata, administered every two hours, and only give a little champagne and soda by the mouth.

### PULSE AND TEMPERATURE.

If all be well the pulse remains slow, full, and regular. During the first twenty-four hours the chief danger is from intra-peritoneal hæmorrhage. Where a drainage tube has been inserted, the blood will well up through this and at once be detected. But where there is no drainage tube we have to depend largely on the pulse. Hour by hour it increases in rapidity, and diminishes in force and volume. As the pulse rises the temperature falls, becoming markedly subnormal. For example, in a case of severe internal hæmorrhage, the pulse which at the time of the operation was strong and 80 per minute, will have risen in two hours to 100; in four hours, to 120; in six hours, to 140. By this time it will have become small and thready, and the temperature will be 96° F., or even lower. We may lay it down as a general rule that whenever during the first twelve hours we find the pulse rising and the temperature falling hæmorrhage is to be suspected.

After the hæmorrhage has been controlled the first sign of re-action is a slow rise of the temperature to normal, followed much later by a fall in the pulse rate. It is, however, a very bad sign if the temperature, after being markedly subnormal

*After-Treatment of Cases of Abdominal Section.* 11

(say below 96° F.) rapidly rushes up to 103° F. or 104° F., especially if at the same time the pulse remain rapid and thready.

The first twenty-four hours safely over, the risk of hæmorrhage is past, and the condition of the pulse acquires a new meaning. A quick pulse on the third or fourth day usually means serious peritonitis. But it is of service rather as an aid to prognosis than as a means of diagnosis. Peritonitis frequently becomes well established before it makes any impression on the pulse. I have rarely observed—after abdominal sections—the “wiry” pulse on which the physicians lay such stress. When the disease is running a fatal course the pulse becomes increasingly rapid and finally uncountable. Coldness of the hands and extinction of the pulse at the wrist are sure signs of approaching death.

On the other hand, the temperature *per se* is not of the least value in peritonitis as an aid to diagnosis or prognosis. The patient may go rapidly to her death with a normal record throughout. In some cases it is markedly febrile, in others it is subnormal. It must be remembered that a rise of temperature towards the close of the first week may be due merely to a stitch abscess. During the second or third week a sudden rise of both pulse and temperature generally means the formation of a hæmatocele. After a few days, absorption begins, and then both pulse and temperature fall to normal. In a small minority of cases the hæmatocele suppurates, and this is indicated by the unmistakable evening rise and morning fall.

In judging of the importance of the record we must take into consideration the patient's age and temperament. If she be young and neurotic, a trivial cause, such as a fit of temper, may produce a marked rise both of pulse and temperature. This, however, is only temporary and quickly subsides. On the other hand, in aged women a quick pulse and high temperature always mean mischief, and must be looked upon with great apprehension.

With regard to the treatment of pyrexia, I have but little to say, for I do not look upon a high temperature as in itself a

## 12 *After-Treatment of Cases of Abdominal Section.*

danger. In some cases where the temperature is over  $104^{\circ}$  F., and the skin hot, dry, and pungent, a vapour bath acts like a charm. Mr. Thornton advocates the application of an ice cap to the head in cases of pyrexia after ovariectomy—a proceeding which seems to me most illogical. The whole series of antipyretic drugs must likewise be shunned by the abdominal surgeon. The only rational treatment is to search for and combat the cause.

### THE EXPRESSION AND GENERAL APPEARANCE.

To the experienced surgeon the patient's aspect is the best of all guides. In one case, at the first glance he reads death written on her face. In another, in spite of grave complications, her placid expression assures him that all will yet be well. Let us briefly look at a few pictures.

In severe hæmorrhage we see the increasing pallor, the blanched, swollen, waxy lips, the dilated pupils, the beaded sweat on her forehead, the dreadful restlessness, and panting for breath.

In acute peritonitis her expression is anxious, worried, and depressed. She may be suffering little or no pain, but she looks and feels exceedingly ill. In the worst cases her eyes become sunken, and dark rings form around them, her features become pinched, and her nose, like poor Falstaff's, "as sharp as a pen." She becomes restless bodily and mentally, but is rarely delirious. To quote Mr. Lawson Tait, "an anxious face keeps me on the tenter-hooks, and a woman that will not keep quiet but goes on chattering is almost sure to die." In a few cases the face becomes suffused with an extraordinary dusky crimson flush, which when present always points to a fatal issue.

In hæmatocele—particularly if it be suppurating—there is often a constrained expression on the face difficult to describe, and a circumscribed flush on the cheek on the same side as the effusion.

In parotitis the diagnosis is evident at a glance. The typical swelling of one or both parotid regions, the characteristic rigidity of the neck, and the difficulty in talking, eating, and swallowing is obvious.

Such are only a few of the pictures. Where all is going well she is calm and placid, and greets you with a smile. She dare not be merry, for her stitches pull her up sharply when she laughs.

#### THE TONGUE.

In straightforward cases the tongue remains clean, moist, and full coloured. A dry tongue is worse than a furred tongue. When we find the posterior third is coated with a thick yellow fur, the patient's diet must be enquired into, as she is probably being overfed by the nurse or meddlesome relatives. The diet must be restricted, and a cholagogue purge given. In mild peritonitis the tongue often becomes coated with a whitish or yellowish-white fur. In graver cases a dry streak forms down the centre. Where there is much bilious vomiting it becomes stained a yellowish-brown.

The tongue I dread to see is shrivelled, brown, rough, and dry, like the ball of a dog's foot. Swallowing becomes difficult, and speech unintelligible. It is a sign of extreme gravity, and, as a rule, is an indication for the free administration of stimulants and calomel. Much relief may be given by occasionally moistening her lips and tongue with glycerine and water. She will probably beg for ice, but this would only aggravate her condition.

In many cases of suppurating hæmatocele the tongue presents a characteristic appearance. It becomes rounded, smooth, dry, glazed, and of a vivid red colour. In fact, it looks exactly like a plum-tomato.

The condition of the tongue helps us in making a prognosis. The drier it is, the worse the outlook. On the other hand, when after being furred it begins to clean, or after being dry it becomes moist, we know a change for the better has set in.

#### VOMITING.

In estimating the import of the vomiting that so often follows an abdominal section, we must take note of three factors—the character of the act, the appearance of the vomited matter, and the date of its occurrence.

It may be due to the anæsthetic, commencing as soon

#### 14 *After-Treatment of Cases of Abdominal Section.*

as the operation is over and lasting the greater part of the first day. The ejecta are thin and watery, and either colourless or of a bright grass green. It need give us no anxiety, and does not call for special treatment. Occasionally a hypodermic of morphia will check it.

It may be due to nervous causes. Thus, after an ovariectomy it may be excited reflexly by the constriction of the nerves of the pedicle. If severe, the best treatment is a small hypodermic of morphia. Now and then it is a grave complication. When a student I watched a case where it persisted day after day in defiance of all treatment, and the patient sank from sheer exhaustion. At the *post mortem* nothing could be discovered to account for it.

Some patients are peculiarly sensitive to morphia. They are usually well aware of their idiosyncrasy, and warn us of it before the operation. I have seen prolonged nausea and vomiting follow a single hypodermic injection.

It may be due to gastric disturbance brought about by injudicious dieting. She has but little nausea, and the vomit consists of partially digested food. The loaded tongue, muddy complexion, and yellow conjunctiva are obvious. She has a headache, is constipated, and her breath is foul. On enquiry, we learn with what rich dainties her friends have been stuffing her "to keep up her strength." All food must be stopped for twelve hours, a brisk chologogue purge must be given, explicit directions must be given as to the diet, and the friends must be excluded from the patient's room. It is difficult to get the public to understand that it is far better to half starve a patient after an abdominal section than to run into the other extreme.

The vomiting of peritonitis is the most grave, and is characteristic. It usually sets in on the third day. There is little or no nausea or retching. The fluid pumps up in gush after gush without warning or effort. Its colour changes with the progress of the disease. At first it is unaltered bile, greenish-yellow and bitter. It later becomes an emerald, and then a dark olive green. In grave cases the hue deepens to a coffee brown, and

in hopeless cases to an inky black. The darker the colour, the worse the prognosis ; and all the cases with black vomit die.

Lastly, the vomiting may be due to true intestinal obstruction. This, in my experience, is a very rare complication, in spite of what some writers assert. I am of course aware that peritonitis paralyses the bowel and brings about a passive obstruction ; but then it is the peritonitis which kills, and the peritonitis which calls for treatment. Where, however, true obstruction occurs, vomiting is a marked feature, and becomes fæcal in appearance and smell. The vomit of peritonitis may be coffee-brown, but is never fæcal.

#### DISTENSION.

One great advantage of the simple form of dressing described is that the whole abdomen can be kept under constant observation by the nurse, and any change at once noted. Where it is hidden beneath multitudinous layers of gauze and wool and bandages, the early signs of peritonitis are apt to be missed and the all-important time lost. Acute general peritonitis, fully established, is as fatal a disease to-day as it was in the early days of ovariectomy. We know more of the causes of the disease and how to avoid them, and we know how to check the disease in its early and curable stage. It is therefore of supreme importance to at once recognise its onset, and treat it promptly. In nine cases out of ten the first sign of peritonitis is distension. The nurse must during the first week be constantly on the outlook for it, and as soon as it appears must commence antiperitonitic treatment.

But not every case with distension has peritonitis. There is the passive distension of atony. A feeble elderly woman has a large ovarian tumour removed. Apparently the sudden relief of pressure favours the formation of gas in the bowel. Coil after coil becomes distended, and can be seen and felt through the thin flaccid abdominal wall. Now and then slow peristaltic movements can be observed creeping from coil to coil. The distended abdomen is painless, perfectly soft and yielding to the hand, and does not yield the drum-like percussion note of peritonitis. The patient has no bad symp-



## 16 *After-Treatment of Cases of Abdominal Section.*

toms. Measures must be taken to secure an early action of the bowels by purgatives and turpentine enemata. Otherwise, the lethargy may become a paralysis, and the patient die with symptoms of slow intestinal obstruction.

There is the distension due to food. She is perfectly flat until the third day, when food is commenced. In a few hours the upper part of the abdomen is found distended. It is apt to occur in nervous, irritable, dyspeptic patients, and is probably due to some fermentative change occurring in the gastric and intestinal contents. The abdomen is perfectly soft, the abdominal wall is freely mobile, and the patient has no bad symptoms.

In very stout patients it is sometimes difficult to distinguish between a slight degree of distension and fat. It should be remembered, however, that a fat abdomen is soft and yielding, wobbles freely under the hand, and yields a rather dull percussion note.

The distension of peritonitis usually appears on the third day. The abdominal wall becomes hard, fixed, and tense, the skin is tightly stretched like a drum, and there is the characteristic tympanitic percussion note. The individual coils of intestine cannot be distinguished, and there are no vermicular movements. Soon the other familiar symptoms appear and crowd the picture.

The hardness or softness of the abdomen to the touch is of far greater importance than the mere amount of distension. If the abdomen is soft and yielding, and can be made to "wobble" under the hand, we need not be alarmed. If it be hard, fixed, and tense, the outlook is grave.

### THE GROUPING OF SYMPTOMS.

It is a mistake to attach undue importance to one or two leading symptoms. We must base our judgments on the grouping of the various clinical features. The age, strength, and temperament of the patient, the character of the operation, the time when the complications appear, and the rapidity of their development, must all be taken into consideration. We must look at each case as a whole.

ON THE USE OF THE DRAINAGE TUBE.

THE value of drainage in abdominal surgery is admitted by all authorities, although considerable difference of opinion exists as to the class of cases in which it is safe to do without it. There are certain cases in which no wise surgeon would think of inserting a tube; for example, after a simple straightforward ovariectomy, where there have been no adhesions or other complications. There are other cases where the patient's only chance of recovery depends on its intelligent use.

I consider it necessary to drain the peritoneal cavity—

1. Where there is peritonitis or ascitic effusion.
2. Where during the operation the peritoneum has been soiled with faecal matter, urine, pus, or offensive contents of tumours.
3. Where the abdomen has been washed out.
4. Where extensive adhesions have been broken down.
5. Where, from any cause, free oozing of blood is taking place into the peritoneum.
6. Where there is reason to believe the bowel or bladder has been injured.

It is a wise precaution to insert a tube where, even though there be no hæmorrhage at the close of the operation, it is likely to occur afterwards. Thus, the surgeon may feel uneasy as to the security of the ligature on the pedicle; or he may have had to operate on a vascular organ, like the uterus, which is prone to bleed. In all doubtful cases my rule is to drain. I have never seen a case where, after inserting a tube, I have regretted doing so; and I have seen numerous cases which, had they not been drained, would certainly have died.

*The Tube.*—The form and material of the tube deserve attention. It must be of stout tough glass, strong enough to resist the great pressure to which it is submitted during the violent retching that so often follows the operation. It should be perfectly straight, and maintain the same diameter (nearly half an inch) from top to bottom. It should be open at the lower end, and not rounded like a test tube. The sides

## 18 *After-Treatment of Cases of Abdominal Section.*

should be perforated at frequent intervals, the holes being nearly a line across, and extending almost to the top of the tube. The upper end of the tube should be turned out into a circular lip or flange an inch in diameter. The tube should be of such a length that when the lower end reaches to the bottom of the pouch of Douglas the circular rim sits easily on the skin.

### *Its Functions.—*

1. It acts as a sentinel indicating the onset of severe internal hæmorrhage in time for its prompt treatment. It is especially needed in cases where vascular adhesions have been dealt with, where the pedicle has not been ligatured satisfactorily, or where some very vascular organ, such as the uterus, has been operated on.

2. It is a potent hæmostatic, checking free oozing by enabling the blood effused to be at once removed, and by admitting air to the raw surface and keeping it more or less dry. If necessary, astringent solutions may be injected down the tube in order to act directly on the source of bleeding.

3. It prevents peritonitis by the removal of fluid—blood, pus, serum, or tumour contents—which, if allowed to remain, would probably undergo septic changes and excite a fatal peritonitis. Where there is a risk of fæcal extravasation, as when a hole has been torn in the rectum, it is simply invaluable.

4. It is a curative agent in peritonitis with effusion, and in ascites due to tubercular disease or papilloma of the peritoneum.

*The Use of the Sucker.*—Some surgeons do not advise clearing the tube by means of a “sucker.” They merely lay a sponge or pad of absorbent tissue over the mouth of the tube, and trust to the fluid finding its way to the surface. Where the fluid is ascitic, a sucker may sometimes be dispensed with; but if it be bloody, the tube is very apt to become choked with clot, and rendered useless for the purposes of drainage. The use of the sucker is advisable in all cases where a tube is used. Mr. Tait's sucker is the best yet devised. Should clots collect in the tube and plug it, they must at once be removed by the sucker. Should this fail to extract them, the tube may be cleared by the

use of a Playfair's probe ensheathed in clean absorbent wool. In cases of free hæmorrhage into the peritoneum, the nurse must drain the tube by means of the sucker very frequently—in bad cases every five minutes. As the loss diminishes it should be done at longer intervals.

The sucker may also be used to inject various solutions into the peritoneum. It is sometimes advisable to inject a weak solution of perchloride of iron into the cavity to try and check bleeding from deep pelvic adhesions.

*The track of the tube* usually becomes quickly shut off from the general cavity by the formation of peritonitic adhesions. This isolation of the track is of great advantage in those cases where a hole has been torn in the rectum, as sometimes happens during the removal of a very adherent pyosalpinx. In such cases a glass drainage tube of large diameter should be inserted, so that its lower end covers the rent. The patient must be given full doses of morphia, kept rigidly on her back, and not allowed to move. In from twenty-four to forty-eight hours the track of the tube will be quite shut off from the general cavity. Should fæces now pass through the rent, they will escape to the surface by the tube and not infect the general peritoneum. The fæcal fistula thus formed heals after the removal of the drainage tube, although the process of closure is often a very slow one.

The surgeon may not be aware that he has wounded the bowel until either flatus or fæcal matter escapes through the tube. Sometimes it is only discovered when the nurse administers an enema and finds it welling up through the wound. Occasionally air will escape freely from the drainage tube, although there has been no possible wound of the intestine. In such cases it is only atmospheric air that has got into the peritoneal cavity during the operation, or has been sucked in by the subsequent retching and vomiting.

*The Character of the Discharge.*—I have already referred to the escape of flatus and fæcal matter. For some hours after the operation a varying amount of blood-stained fluid will be

## 20 *After-Treatment of Cases of Abdominal Section.*

removed. In favourable cases this hourly diminishes, and finally becomes serous and scanty. If severe hæmorrhage occur, as from the slipping of the ligature, bright fresh fluid blood pours out copiously through the tube, clotting on the dressings and in the tube itself. From the character of this hæmorrhagic discharge the source of the loss may be diagnosed, its severity estimated, and the necessity or not of interfering determined.

If the operation has been for the evacuation and drainage of purulent collections, the discharge will continue to be purulent for some days. This need excite no alarm. But in cases where there has been no previous suppuration, the appearance of pus in the discharge is of very grave import if it occur within three days after the operation. Should it occur later—for example, on the sixth day—it is not such a serious matter. Where the discharge becomes offensive, the tube must be frequently syringed out with iodine water. Where this fails to subdue the fœtor, the drainage tube must be removed temporarily and the offensive cavity irrigated with iodine water, and a fresh drainage tube inserted. This irrigation may be repeated twice or thrice a day until the discharge becomes sweet. Where the serous discharge continues very profusely, as in the ascites of papilloma of the peritoneum, there should be no great hurry to remove the tube. On the third day, if the drainage tube cannot then be dispensed with, it ought to be changed for a clean one, the same size or slightly smaller. As soon as the discharge becomes serous and scanty, the tube may be removed altogether.

*The Evils of the Drainage Tube.*—Let us consider each of these in turn.

1. If it be retained longer than a few hours, it undoubtedly prevents primary union at the site of its insertion. After its removal, the aperture heals by granulation. At most, however, this means only a delay of a very few days.

2. If the drainage tube be retained many days, there will be a greatly increased risk of the subsequent formation of a ventral

hernia. The site of the tube remains as the weak spot in the line of the cicatrix.

3. It may break during vomiting. This can only occur where a very thin fragile tube is used. I have had no personal experience of this accident, but I have heard of cases where it has happened.

4. If the tube used be too short and have no circular rim, it may slip wholly into the peritoneal cavity. When the nurse goes to drain the tube, she finds that it has disappeared and the wound has closed over it. To remove it, the surgeon must take out a stitch, pass his finger into the abdomen and feel for the tube. It is usually easily discovered and brought to the surface. Should this fail, an anæsthetic must be given, the abdomen re-opened, and a thorough search made for it. It is an accident that cannot happen if the tube be provided with a wide rim.

5. If too long a tube be inserted, the lower end rests on the rectum whilst a considerable portion projects beyond the skin. Should the binder or bandage be applied very tightly, the tube is made to exert injurious pressure on the rectum, and may even punch a hole in it. In applying elastic pressure to the abdomen, care must be taken to arrange layers of pads of cotton wool around the tube in such a way that no pressure is made by the binder directly on the tube.

6. The tendency of the omentum to protrude through the holes in the sides of the drainage tube is very remarkable. It becomes applied to the tube, and is forced by the intra-abdominal pressure through the perforations as a series of fatty herniæ. Each of these projects into the lumen of the tube as a pear-shaped mass of fat, whose narrow neck is constricted by the margin of the hole. The venous return in each protrusion is obstructed, and it becomes congested, swollen, and finally strangulated. There may be only one such hernia, usually there are from three to five, and I have seen cases where every hole has been invaded, and the lumen of the tube completely choked with engorged omentum. Such a condition may arise at any

## 22 *After-Treatment of Cases of Abdominal Section*

time during the first twenty-four hours. It is recognised by the mooring of the tube. When the nurse turns the tube round—as she should do each time she drains it—she finds that after making one or two turns the tube becomes held. On reversing the twisting movement, it first becomes free and then again is held. If an attempt be made to withdraw the tube from the abdomen, it will be resisted.

To relieve the tube from its toils, the tube should be twisted round until it becomes fixed, and it should be retained in this position. This puts the omental protrusions on the strain, and tends to slowly draw them out of the holes. Should it fail, the surgeon should draw the tube slowly and steadily up towards the wound until the topmost hole with its omental hernia comes into view. This may be ligatured just beyond the tube, and snipped off with scissors. The other holes, as they come to the surface, are dealt with in like fashion until the tube is free. The exposed omentum is washed and returned to the abdomen, and a fresh drainage tube is inserted.

### HÆMORRHAGE AFTER ABDOMINAL SECTION.

The chief risk the patient runs during the first twenty-four hours is that of hæmorrhage. The source and severity of the bleeding varies with the particular operation performed, but the signs and symptoms are the same, whether the bleeding be from the vessels of the liver, the mesentery, or the pelvis.

It will be convenient, in the present paper, to deal mainly with hæmorrhage as it occurs consecutive to ovariectomy—taking this as the type of all abdominal sections.

Ovarian tumours may be divided into two groups, (*a*) those with adhesions; (*b*) those free from adhesions. If after the removal of a non-adherent tumour severe hæmorrhage occurs into the peritoneum, it must come from the vessels of the pedicle. If there have been vascular adhesions it may come either from these or from the pedicle.

*Hæmorrhage from adhesions.*—In the earlier years of ovariectomy—in the days when the operation was the last resource

and only undertaken after repeatedappings—desperate adhesions were common. Now-a-days patients are operated on as soon as the growth is discovered, and such adhesions are rare. But every now and then one of the old-fashioned cases turns up. There is scarcely any structure in the abdomen covered by peritoneum to which an ovarian tumour may not contract adhesions. These are frequently highly vascular and may contain vessels larger than those of the pedicle itself. I have seen clusters of tortuous veins, each as large as the femoral, passing from the tumour to the omentum. Visceral adhesions, such as those to the liver, intestine, and uterus, bleed freely when separated. Adhesions to the anterior abdominal wall are often extensive but rarely vascular. Those to the posterior abdominal wall and to the sides of the pelvis may bleed furiously.

During the progress of the operation the surgeon will control the hæmorrhage from these various sources *secundum artem*—using in different cases the ligature, forcipressure, sponge-pressure, Paquelin's cautery, and various astringents. He will, if possible, stop all bleeding before closing the wound. Frequently, however, where an extensive raw surface has been left by the separation of adhesions, the patient has to be put back to bed with free capillary hæmorrhage going on.

*Hæmorrhage from the pedicle.*—This may come about in several ways.

(a) The ligature may have been tied insecurely and slip. Surgeons often condemn the Stafford knot as untrustworthy. The knot is a perfectly safe one; and if it comes undone it is because it has been badly tied.

(b) In other cases, though the knot has been tied correctly the broad ligament slips from within its grasp. This is apt to occur where the pedicle has been cut too close to the ligature, or where the pedicle is very short and broad. Each act of retching or vomiting puts a strain on the broad ligament which tends to pull it out of the grip of the ligature.

(c) If the pedicle contain much non-striped muscle, or be œdematous, its tissue is apt to shrink and the ligature become loose.



## 24 *After-Treatment of Cases of Abdominal Section.*

(d) From various causes hæmorrhage may take place into the connective tissue of the pedicle below the ligature, forming an acute hæmatocele of the broad ligament. If this grows rapidly it tends to force the ligature up over the rest of the pedicle until it slips off altogether. The hæmatocele then bursts into the peritoneal cavity and the patient may rapidly become ex-sanguine. In other cases the ligature holds, but the broad ligament becomes distended with blood to such an alarming extent as to threaten life. A patient may bleed to death into her extra-peritoneal tissue.

*Hæmorrhage from the abdominal wound.*—This can only be serious in “bleeders.” Patients suffering from hæmophilia, leucocythæmia, purpura, or advanced jaundice, are of course most unsuitable cases for a surgical operation. I once watched a patient, who had undergone the operation of removal of the spleen for leucocythæmia, slowly die from hæmorrhage, each stitch hole bleeding like a wounded vein.

### THE SIGNS AND SYMPTOMS OF INTERNAL HÆMORRHAGE.

In those cases where a drainage tube has been inserted, the first sign of hæmorrhage is usually a stream of pure blood welling up through the tube and saturating the dressings. As fast as the nurse empties the tube with the sucker, it refills. It is impossible in such cases to over-estimate the value of the drainage tube. It is the sentinel which first warns us of the approach of danger. It reveals the onset of hæmorrhage in time to deal with it before it has gone too far. By its means we can gauge the rapidity and severity of the loss, and so decide the necessity or not of interfering. But to act efficiently, the tube must be kept free from clot by means of the sucker and Playfair's probe; otherwise active hæmorrhage may occur into the peritoneum, and yet no blood escape externally because of the plugging of the tube.

Where numerous vascular adhesions have been separated, there is usually for some hours a free discharge of bloody fluid. This is most severe immediately after the operation, and steadily

becomes scantier and more watery. This loss need occasion no alarm. But if the discharge rapidly becomes brighter, thicker, and more copious, fresh fluid blood pouring into the tube as fast as this is emptied with the sucker, then active interference is indicated. But in the cases where the surgeon has not inserted a drainage tube the hæmorrhage is concealed. It is easy enough to diagnose hæmorrhage when the patient is blanched, gasping, and pulseless; but it is then too late. Her salvation depends on its *early* recognition. The nurse should know the signs and symptoms of hæmorrhage as she knows her alphabet. She must be constantly on the look out for them, and if she has only a suspicion of something wrong, should summon the surgeon.

In the early diagnosis of hæmorrhage I attach most importance to the pulse and temperature. If carefully recorded observations be taken frequently, it will be noticed that where bleeding is taking place the pulse steadily becomes more rapid and more thready, whilst the temperature falls. This progressive hourly rise in the pulse and fall in the temperature, occurring within a few hours of the operation, is almost diagnostic. An experienced nurse will detect bleeding at an early period by the "look" of the patient. There is an increasing pallor of the cheeks, a loss of colour of the lips, and a waxiness of the skin which she knows too well. As the hæmorrhage continues, the patient's breathing becomes quickened, the "air-hunger" becomes acute, she sighs and pants, and begs to be raised in bed. She becomes more and more restless, throws her arms about, and tosses off the clothes. She suffers from intense thirst.

On examining the abdomen, it is sometimes easy in thin patients to detect the presence of free blood in the peritoneum. If the blood be clotted, it is felt as a soft, boggy, ill-defined fulness in the lower abdomen, dull on percussion. If it remain fluid, there will be dulness in the flanks, changing in position as the patient is turned from side to side. Distinct fluctuation may be made out. On vaginal examination, the soft boggy

## 26 *After-Treatment of Cases of Abdominal Section.*

collection of blood may be felt filling the pouch of Douglas. In cases where a broad ligament hæmatocele forms, the physical signs are very definite. There is felt rising out of one side of the pelvis a tense, firm, fixed, dome-shaped mass, which may or may not exhibit fluctuation. Per vaginam the same mass will be felt crowding the uterus forwards and to the other side of the pelvis, and limited sharply below by the pelvic fascia.

As the case goes from bad to worse, the patient becomes collapsed. The pupils are widely dilated, the forehead damp with cold sweat. The thready pulse, 160 or more to the minute, becomes uncountable and then imperceptible. The temperature falls to 95° F. or even lower, and the limbs become cold. Consciousness, which has been retained till now, becomes lost, the gasping for breath slowly ceases, and all is over.

But the surgeon must not wait for the development of the classic symptoms of hæmorrhage before he interferes, or he will wait too long. In cases where no drainage tube has been inserted, and where he has a suspicion that bleeding may be taking place internally, he should remove one or two sutures and push a glass drainage tube down to the bottom of the pouch of Douglas. If there be no bleeding, only a little blood-stained serum will escape; but if hæmorrhage be going on, the blood will at once well up freely through the tube. I have found this drainage-tube test, in cases of doubt, of great value.

### TREATMENT OF HÆMORRHAGE.

There are few emergencies that more severely test a surgeon's judgment, courage, and resource, than a bad case of internal hæmorrhage after abdominal section. Face to face with a case the surgeon, in deciding on the line of treatment, must take into consideration the complications, such as adhesions, met with at the operation, and how they were dealt with, the character of the pedicle, the probable source of the hæmorrhage, the severity of the loss of blood, and the impression this loss is making on the patient's general condition.

*Hæmorrhage from the pedicle.*—If severe internal hæmorrhage takes place a very few hours after the removal of a non-adherent

tumour, it is almost certainly due to the slipping of the ligature. The surgeon must without the least delay reopen the abdomen under chloroform, clear out the clot, and examine the pedicle. It is seen or felt not as a raised double fold of peritoneum, but as a large irregular bleeding area between the uterus and the brim of the pelvis. The peritoneal edges of this area should be rapidly seized with the forceps and pulled up towards the wound. In this way the broad ligament may be reformed. If possible it should be transfixed and re-tied with a strong ligature. Where this cannot be done the bleeding must be controlled by forcipressure. Apply one pair of Spencer-Wells' large forceps to the inner border of the broad ligament, close to the uterus. This compresses the uterine artery and its branches. Now apply another pair to the outer part of the broad ligament to control the ovarian artery. If the portion of the ligament between the two pairs of forceps still bleeds it may be grasped by Thornton's T-shaped forceps. Having stopped the bleeding now wash out the abdomen with plenty of warm water. This removes clots which if left might cause peritonitis. The water is partly absorbed by the blood vessels and so augments the volume of blood circulating. It is in fact a substitute for transfusion. The sutures are inserted and tied, the handles of the forceps being left projecting through the wound. They may be cautiously removed in about twenty-four hours. The surgeon must never undertake these "second operations" rashly, because they are terribly fatal. But whenever it *is* necessary to re-open the abdomen it should be done at once; time is all important.

*Hæmorrhage from Adhesions.*—If this be severe and not controlled by the use of the drainage tube and sucker, an abdominal compress must be firmly applied. The whole of the front of the abdomen should be covered with pads of cotton wool several layers deep, and disposed around the drainage tube so as to protect it from pressure. Folded towels are laid over the pads, and then over all a strong binder is applied very firmly. To increase the pressure, two or three pieces of broad elastic bandage may be fastened over the binder, and pulled as tight as possible. In addition, if the bleeding be from deep

## 28 *After-Treatment of Cases of Abdominal Section.*

pelvic adhesions, the vagina may be firmly plugged, so as to compress the vessels from below. If compression fails to control the bleeding, a weak solution of perchloride of iron may be injected down the drainage tube into the pelvis. It is sometimes very effectual. If this does not succeed, the surgeon may have to re-open the abdomen as a last resource. He must wash out the clots, search for the source of the bleeding, and deal with it according to the general rules of surgery, using the ligature, forcipressure, sponge pressure, the cautery, or astringents, as may be necessary. In cases where there is alarming hæmorrhage from deep pelvic adhesions which other measures fail to control, the pelvic cavity should be firmly plugged with a long strip of iodoform gauze, the end of which is brought out through the abdominal wound. The vagina should also be tightly plugged at the same time, so as to exert counter-pressure on the bleeding vessels. The gauze may be cautiously removed in about forty-eight hours.

*Extra-peritoneal Hæmorrhage.*—If a broad ligament hæmatocele form, it should be left alone, as in ninety-nine cases out of a hundred the hæmorrhage ceases spontaneously, and the effused blood is slowly absorbed. Mr. Tait records a case where he re-opened the wound, opened the broad ligament, turned out the clots, and sponged out the cavity with an astringent. But cases requiring such measures are extremely rare.

*General Treatment.*—The foot of the bed should be raised, and in bad cases the arms and legs bandaged. Brandy and champagne may be given if the pulse be failing. Ether may be injected hypodermically in conditions of collapse. Small doses of morphia, given hypodermically, diminish the restlessness. The patient must be kept warm and wrapped up in blankets. In very severe cases I have seen excellent results from the injection into the rectum of a quart of a warm solution of common salt (one drachm to the pint). To assist the patient in retaining it, the rectum should be firmly plugged. If necessary, the injection may be repeated in three or four hours' time. It is quite as efficacious as intravenous injection, and not nearly so troublesome.

PERITONITIS.

IN nine cases out of ten this formidable complication is due to the fouling or infection of the peritoneum during the operation; and it is therefore a preventable disease. "Cleanliness is the highest virtue in surgery;" and in abdominal work it is the great secret of success. I would far rather have my own abdomen opened by a clean surgeon of but moderate skill than by the most dexterous dirty one. Prevention is ever better than cure; and a clean careful surgeon can nearly always avoid the causes and prevent the onset of peritonitis by the adoption of suitable precautionary measures

*Precautions before the operation.*—

1. The sanitary surroundings should be as perfect as possible. The room should be far away from water-closets, sinks, or ill-trapped drains. It should be impossible for sewer-gas to reach the patient.
2. The water to be used during the operation should be boiled.
3. The sponges, besides being of the finest quality, should be absolutely aseptic. For twenty-four hours before they should be put to soak in 1 in 20 carbolic solution. Immediately before the operation they should be washed in plenty of boiled water to remove the carbolic acid.
4. The silk (to be used for ligatures, etc.) should be wound loosely on glass reels, boiled for one hour, and afterwards preserved in 1 in 20 carbolic solution.
5. All glass instruments—such as drainage tubes and suckers—should be boiled before the operation. All steel instruments should be scrupulously clean, particular care being bestowed on the teeth and joints of forceps and the eyes of needles. They may be sterilised by dry heat, or boiling water, or by immersion in 1 in 20 carbolic solution.
6. The pubic hair should be shaved off.
7. The surgeon should endeavour to attain immaculate purity of the skin of the patient's abdomen, and the hands and fore-arms of himself, his assistants, and nurses. The skin should be

### 30 *After-Treatment of Cases of Abdominal Section.*

smear with turpentine, well scrubbed with soap and hot water, using a hard clean nail brush, and afterwards washed in some reliable antiseptic solution (carbolic, sublimate, or iodine). An antiseptic vaginal douche should be given.

8. No one who has been contaminated by any septic or infective case should be permitted even to enter the room during the operation—still less to assist in its performance.

#### *Precautions during and after the operation.—*

1. The utmost care should be taken to prevent the escape into the peritoneal cavity of pus, cyst contents, old blood, fæces, urine, etc. Should any such material contaminate it, the abdomen should be irrigated with warm boiled water and sponged clean.

2. In cases where indicated the use of the drainage tube is a potent preventative of peritonitis.

3. Before closing the wound the surgeon must make quite sure that no sponge has been left inside—nothing would be more certain to induce a rapidly fatal peritonitis.

4. The wound should be kept clean and dry, dusted with iodoform or powdered boric acid, and covered with some aseptic or antiseptic absorbent dressing such as Gamgee tissue or sal alembroth wool.

5. The drainage tube should be emptied at frequent intervals with a sucker, and the latter must be kept scrupulously clean. Should the discharge become offensive the tube should be irrigated at intervals of a few hours with warm iodine water.

6. An early movement of the bowels should be secured, unless during the operation the intestine has been injured.

7. In order to increase the absorptive power of the peritoneum, no food or drink should be given during the first twenty-four or forty-eight hours.

8. The nurse should be instructed to be on the look-out for the first symptoms of the disease and, on their appearance, to at once commence active treatment.

*The Clinical Features of Peritonitis.*—As a rule, the first symptoms appear on the third day. The earlier they appear, the graver is the outlook.

1. The abdomen becomes markedly distended with flatus, and yields a tympanitic note. The individual coils of intestines can rarely be distinguished, and there are no visible vermicular movements. The abdominal wall becomes hard, tense, brawny, and moves but slightly with respiration.

2. Vomiting soon sets in, at first of unaltered bile—yellow and bitter. As the disease advances, it becomes emerald and then olive green in colour. In grave cases it is dark coffee brown, and in hopeless cases black. There is often little or no nausea, the fluid pumping up in gush after gush without any retching.

3. Constipation is absolute, not even flatus passing.

4. The pulse, slow at first, becomes rapid and soft; and the quicker the pulse, the greater the danger.

In some of the worst cases the only signs of mischief are a rapid soft pulse and an anxious face. There may be no vomiting, no tympanites, no pain; but the patient rapidly succumbs, and *post mortem*, acute general peritonitis is found. In such cases the cause of death is probably an acute septicæmia.

5. The temperature may be normal, subnormal, or febrile. The thermometer is of very little use in the diagnosis of peritonitis. A subnormal temperature, especially if there be a rapid pulse, is a bad sign.

6. The tongue is covered with a creamy white or bile-stained fur. In grave septic cases it is dry and brown.

7. The face is pinched and anxious, the features sunken, and dark rings form round the eyes. The patient is depressed; and though she has little physical pain, she feels very ill. The mind is usually perfectly clear. Towards the end she becomes very restless.

8. The excruciating pain, the exquisite superficial tenderness of the abdomen, the drawing up of the knees, and the hard wiry pulse described by all the text-books, are clinical features seldom present in the peritonitis following abdominal sections.

*The Elements of Prognosis.—*

1. The following are very grave signs:—Pulse above 140, temperature very high or very low, dry brown tongue, pinched



32 *After-Treatment of Cases of Abdominal Section.*

anxious face, coffee-coloured vomit, very hard tumid abdomen, entire failure of repeated purgatives, marked restlessness.

2. The case is hopeless if the vomit be black, if the pulse cannot be counted at the wrist, or the hands become cold.

3. On the other hand, we may predict recovery if the bowels move freely, the abdomen become softer, the vomit lighter, the face brighter, the tongue moister, the pulse slower.

*Treatment.*—This may be summed up in one sentence—*Get the bowels moved.*

1. A rapidly-acting purgative should be administered on the first sign of distension. The best drugs to give are undoubtedly calomel and salines, administered alternately. Give five grains of calomel and, in three hours' time, a Seidlitz powder or a dose of sulphate of magnesia. If there be no action of the bowels, repeat the calomel in another three hours, and follow it with a second seidlitz powder. Persevere in this way until the desired result is attained. It is remarkable how seldom even heroic doses of calomel, given in peritonitis, produce mercurialism. It is a race and a fight between us and the disease for the command of the bowels. If we can purge the patient, she will almost certainly recover.

2. Turpentine enemata are of great value. They should also be commenced on the first sign of mischief, and repeated every three or four hours. The enema consists of half an ounce of turpentine mixed with half a pint of hot soap and water. Where this fails, an ounce of castor oil should be added to it. The enema asafœtidæ (B.P.) is often useful in aiding the passage of accumulated flatus. In obstinate cases we can sometimes start the action of the bowels by the following enema:—Glycerine, 1½ ounces; sulphate of magnesia, 1 ounce; water 2½ ounces. The passage of flatus is a hopeful sign, and should be assisted by the frequent use of the flatus tube. On the other hand, it is not a good omen when the enemata are retained by the torpid rectum.

3. To allay the sickness, a little lemon juice and soda water is of service. It probably acts by neutralising the alkaline bile

in the stomach. Sometimes a little champagne is beneficial. If the vomiting be slight, small quantities of Valentine's meat juice may be given. Brandy and beef tea enemata should be administered an hour after each purgative enema if there be signs of exhaustion.

4. No morphia should be given as long as a chance of life remains. It would only increase the intestinal paralysis, and seal the patient's doom. Moreover, pain is rarely a marked symptom. But where the case is hopeless, morphia may be given freely to combat the dreadful restlessness that precedes the death agony.

5. It is worse than useless to reopen the wound and wash out the abdomen in acute diffuse peritonitis. Such a proceeding can only be of service where there is a limited localised collection of blood serum or pus.

6. In some cases the peritonitis is secondary to a suppurating intra-peritoneal hæmatocele. I have already discussed the causes of acute hæmorrhage into the peritoneum. Should the patient not die the hæmatocele will become chronic. A chronic blood effusion may also form without any preceding acute symptoms in cases where extensive vascular adhesions have been broken down and free oozing has taken place—particularly if the abdomen be imperfectly drained. The blood collects in the pelvis distending the pouch between the uterus and the rectum. Above, the collection of blood becomes walled in by lymph and peritonitic adhesions. As a rule these hæmatoceles are slowly absorbed. Should, however, septic changes occur, the clot breaks down into a grumous pus which is horribly offensive. A more or less severe peritonitis is lit up. The condition may be often diagnosed by bearing in mind the complications met with at the operation. It will be noticed that the abdomen is most distended and hardest in the hypogastrium. On vaginal examination the tense collection of fluid is felt bulging behind the uterus. There is well-marked pyrexia at night, night sweats, loss of flesh and, in severe cases, symptoms of general septic poisoning. The indication is obvious—to remove the decomposing

### 34 *After-Treatment of Cases of Abdominal Section.*

blood. At the most likely spot gently separate the lips of the wound with dressing forceps and when the peritoneum is reached push a round-ended glass drainage tube down to the bottom of the pouch of Douglas. If by this proceeding a hæmatocele is tapped the opening should be enlarged (by tearing), a double-channeled catheter introduced, and the cavity irrigated with plenty of warm iodine water (1 drm. to 1 pint) to remove the stinking blood. A drainage tube should then be inserted. The irrigation should be repeated night and morning till the discharge becomes sweet. Another method—not quite so efficacious—is to open and drain the collection through the vaginal roof.

#### EXTRA-PERITONEAL HÆMATOCELE.

This is an effusion of blood into the cellular space, bounded below by the pelvic fascia and above by the pelvic peritoneum. From the fact that the bulk of the blood is poured into the tissue of the broad ligament it is often spoken of as a “Broad Ligament Hæmatocele.” But it is by no means always confined to the limits of that structure, involving as it sometimes does the whole pelvic roof.

It is apt to occur after operations on the pelvic viscera, in which the broad ligaments are ligatured or clamped. It is seen most frequently after the removal of the uterine appendages and ovariectomy, and occasionally after hysterectomy. •

#### *Mode of Formation.—*

1. In a few cases the effusion begins at the time of the operation. In one remarkable case I saw the broad ligament suddenly fill with blood, forming a tense purple tumour as large as a foetal head, before the wound was closed. In delivering the tumour through the wound the surgeon may drag unduly on the pedicle and rupture one or more of the blood-vessels. In other cases, in transfixing the pedicle with the ligature needle, the surgeon wounds one of these vessels, and a copious hæmorrhage takes place into the cellular tissue below the ligature.

2. But in the great majority of cases it occurs later—usually during the second or third week after the operation—and, I

believe, has its origin in an abortive attempt on the part of the nerve centre governing the process of menstruation, to bring about the menstrual flow. By way of illustration let me describe a case :—A patient, who usually menstruated regularly every four weeks, the period lasting four or five days, had her uterine appendages removed on the 9th of the month. Her previous period began on the 1st and ceased on the 5th. She made an uninterrupted recovery from the operation until the 26th of the month, when a hæmatocele formed in the left broad ligament. Had the operation not been performed she would have commenced to be unwell on the 28th or 29th day of the month.

In the operation, the ovaries and tubes were removed, the menstrual nerves severed, and the upper half of the broad ligament tightly constricted with a ligature. The menstrual centre, as the time for the period approached, brought about in the vessels of the pelvis, and particularly of the broad ligament, that vascular turgescence which usually precedes the menstrual flow. One or more of the turgid damaged vessels in the ligament burst and bled into the cellular tissue—and a hæmatocele was formed.

*The Anatomy of a Hæmatocele.*—We have seen how the hæmorrhage may be brought about. Let us now see where the blood goes and what becomes of it. The blood is poured into the loose connective tissue, and forms a rounded mass embedded between the two layers of the ligament, which are thus widely separated. The peritoneum, forming these layers, is put on the stretch and resists further distension. The effused blood, driven in the direction of least resistance, infiltrates the cellular tissue below the level of the ligament. It burrows downwards till it reaches the pelvic fascia, which limits it below, the lower surface of the hæmatocele corresponding with the upper surface of the fascia. The distension of the broad ligament lifts the peritoneum bodily upwards. The peritoneum lining the pouch of Douglas is raised, partly by the traction upwards of the broad ligament, partly by the blood dissecting beneath it. A tense

### 36 *After-Treatment of Cases of Abdominal Section.*

collection of blood thus comes to be formed beneath the peritoneum, to one side of and behind the uterus, in front of the rectum, and above the vagina. It tends to burrow backwards along the utero-sacral ligaments to the tissue around the rectum, embedding the latter in a tight collar of effusion. Similarly, the blood may pass forward under the peritoneum in front of the broad ligament, by the side of the bladder, and on to the anterior abdominal wall; or it may escape at the outer margin of the ligament into the cellular tissue of the iliac fossa. Its progress is stopped below by the pelvic fascia, internally by the firm adhesion of the peritoneum to the uterus, and above by the resistance of the broad ligament to further distension. The hæmorrhage is arrested by two of nature's hæmostatics—pressure and clotting: pressure, because the space into which the blood is poured is confined and limited; clotting, because each strand of the connective tissue network becomes a centre for coagulation.

#### *Terminations.*—

1. In very rare cases it may burst into the peritoneal cavity. This accident happens only in those cases where a large extra-peritoneal hæmatocele forms during or immediately after the operation. The extreme tension on the broad ligament pulls it out of the grasp of the ligature. The blood then pours into the peritoneum, the hæmorrhage starts afresh, and, if the abdomen be not promptly reopened, the patient rapidly bleeds to death.

2. The patient may bleed to death into her own extra-peritoneal tissue, the blood escaping into the loose tissue of the posterior and lateral abdominal walls. This, however, is very unusual.

3. It may suppurate and form one variety of pelvic abscess. This is not at all uncommon, and may be the result of the injudicious use of the exploring needle. In other cases micro-organisms probably pass into the effusion from the rectum and infect it. The pus, if it be not evacuated by the surgeon, may discharge into the rectum, vagina, or bladder, or through the abdominal wound. After such discharge, a complete cure, as a

rule, results. But occasionally such an abscess becomes chronic, pouring out pus for many months.

4. In the vast majority of cases the blood is absorbed and a natural cure effected. This process may be a very slow one, occupying weeks or months. Months afterwards no trace of it may be discovered on vaginal examination. In a few instances, however, the pelvic roof on that side remains permanently contracted, fixed, and indurated.

5. In a small minority of cases the hæmatocele recurs at an interval of several weeks or months. There may be a succession of such disasters disabling the patient.

*Clinical Features.—*

As a rule the onset occurs a few days before the date of the next menstrual period after the operation. The symptoms vary—in some they are well marked ; in others so mild as almost to escape observation.

1. There is a sudden onset of pain in the pelvis, worse on one side. There is often pain in the back and bearing down.

2. Where a large hæmatocele forms rapidly there may be faintness, pallor, and other signs of internal hæmorrhage.

3. The pulse rises, perhaps to 100 or 110, and there is a moderate degree of fever.

4. Defæcation becomes difficult and painful, and there is often a copious mucous discharge from the rectum.

5. The tongue in some cases is coated, and there is anorexia and general malaise

6. On examining the abdomen, a deep seated fixed rounded mass is felt rising out of the pelvis on one side (usually the left) of the wound. It usually extends one or two inches above the pelvic brim, but occasionally it reaches up to the umbilicus. Internally it reaches the middle line. Externally it extends to the pelvic brim, and in those cases where it invades the iliac fossa, it may reach as far as the anterior superior iliac spine. Its upper surface is smooth and dome-shaped. It is only tender to pressure when the peritoneum over it is inflamed. In consistence it feels solid and brawny, but if coagulation be not com-

### 38 *After-Treatment of Cases of Abdominal Section.*

plete it is elastic and fluctuating. It is dull on percussion, whilst the rest of the abdomen is often hyper-resonant. On vaginal examination a hard fixed mass is felt to one side of and behind the uterus, displacing it forwards and to the other side of the pelvis. The lower surface frequently presents a peculiar concave vaulting. Mr. Tait thus graphically describes it :—"It is like an irregularly-shaped jelly-fish, rounded above and concave below ; and the edges of the mass are felt to fade off downwards on the walls of the pelvis, just as the groins of a Norman crypt fade off on the brackets or capitals which support them." On rectal examination the characteristic annular structure is felt in cases where the blood dissected backwards around the rectum.

When the process of *absorption* sets in, the pulse and temperature fall to normal, the pain disappears, and the tongue cleans. There is often at this time a distinct yellowing of the skin from the absorption of blood pigment. On examination, the hæmatocele is found smaller and harder, and in a month or so no trace of it may be found.

*The occurrence of suppuration* is indicated by the familiar symptoms of pelvic abscess. The patient obviously becomes worse. There are often initial rigors. The temperature runs up at night to about 104° F., with a well-marked morning fall. At night there are profuse sweats. The pain becomes throbbing. The cheek on the same side is flushed. The tongue is coated or else bright red, smooth, and glazed like a tomato. There is headache, anorexia, and sometimes vomiting. On examination, the hæmatocele daily becomes larger, tenser, more prominent, and more evidently fluctuating. It finally bursts through the vaginal roof into the rectum, or through the wound, and discharges its chocolate-coloured pus. In severe cases the broken-down blood becomes horribly fœtid, and then grave symptoms of septic poisoning may supervene.

#### *Treatment.*—

1. Keep the patient perfectly at rest, and leave nature to arrest the hæmorrhage.

2. Should, however, there be evidence that the hæmatocele has burst into the peritoneum and there is alarming internal hæmorrhage, the abdomen should be reopened without delay, the clots washed out, and the bleeding broad ligament re-ligatured.

3. Never be tempted to use the aspirator "to clear up the diagnosis," unless there be undoubted evidence of suppuration. Its indiscriminate use will convert many a benign collection of blood clot into a septic pelvic abscess.

4. When the effusion has clearly become purulent, and especially if there be septic symptoms, it should be evacuated without delay. If it bulge into the vagina, it should be tapped at the most prominent point with a trocar and canula. Before the latter is withdrawn, a piece of indiarubber drainage tube should be slid through it into the cavity.

5. If the hæmatocele point towards the skin, the lips of the wound should be separated with a pair of dressing forceps, and the latter pushed on into the cavity of the hæmatocele and a piece of drainage tube inserted. If the contents be offensive, the cavity should be irrigated twice or thrice a day with iodine water.

#### INTESTINAL OBSTRUCTION.

Intestinal obstruction, consecutive to an abdominal section, may arise from a variety of causes. In some cases it is directly due to and immediately follows the operation. In others it is due to secondary changes and does not manifest itself till weeks or months after.

1. It may be due to the inclusion by a careless surgeon of a piece of intestine in the abdominal wound between two of the sutures. When the sutures are tied the included segment of bowel is tightly nipped by the sides of the wound.

2. In suturing the wound the surgeon may unwittingly transfix a piece of intestine if it be adherent to the anterior parietal peritoneum.

In these two cases the obstruction is in the small intestine and is acute—dating usually from the time of the operation.



Violent retching and vomiting, pain in and around the wound, constipation, distension, and rapid collapse are the chief clinical features. If the cause be suspected one or more stitches should be removed, the wound explored, and the constriction relieved.

3. In cases of supra-vaginal hysterectomy (for myoma) the cervix is dragged forwards into the wound by the transfixion pins. The utero-sacral ligaments, which pass backwards from the cervix and embrace the rectum, are dragged on. If there be great tension on the stump these ligaments will tightly constrict the rectum—even to the extent of producing total obstruction. Such an accident may be suspected where acute obstruction of the large intestine immediately follows a hysterectomy. On vaginal and rectal examination the tense ligaments may be felt. It is a non-infrequent cause of death after hysterectomy. If the tension on the stump cannot be lessened, and there be total obstruction, the best treatment is to perform a lumbar colotomy.

4. The annular constriction which frequently occurs as a result of a broad ligament hæmatocele has been mentioned. Usually the stricture will admit the forefinger, but in rare cases it may entirely occlude the lumen. Whenever obstruction of the large intestine immediately follows the formation of a hæmatocele, this form of stricture should be suspected and a rectal examination made. The treatment indicated is to empty the hæmatocele. If this does not relieve the stricture an attempt may be made to dilate it. Failing this, if the symptoms be urgent, colotomy may have to be performed.

5. A paresis of the bowel due to atony and flatulent distension is apt to occur in a feeble old woman after the removal of a big ovarian tumour. The sudden relief of pressure seems to favour the formation of gas and a soft painless but very marked distension occurs. At first there are no other symptoms—but should the condition be neglected the lethargy of the bowel may become a paralysis and the patient die with symptoms of slow intestinal obstruction. The treatment indicated is to give a rapidly-acting purgative and administer turpentine enemata.

6. Peritonitis is itself a cause of intestinal obstruction. It causes a paresis, and later a paralysis of the bowels. This paretic condition is induced by at least two factors—(a) the over-distension of the bowel with gas; (b) the extension of the inflammation to the muscular coat of the intestine. I have already discussed the diagnosis and treatment of peritonitis.

7. Intestinal obstruction may occur many months after the operation.

(a) A coil of intestine may become adherent to a raw surface left at the close of the operation. Thus it may adhere to the cut surface of the pedicle, the posterior aspect of the abdominal wound, or any raw surface left by the separation of adhesions. If a portion of intestine itself be denuded of its peritoneum, this raw patch is specially apt to become adherent to other structures. When once such an adhesion has occurred, it is easy to understand how at any time in the future a kink may occur and intestinal obstruction result.

(b) After a severe attack of peritonitis, the intestines are left permanently and densely matted together, and these chronic adhesions may, months or years after the operation, be the cause of obstruction.

In cases where such obstruction occurs months after an abdominal section, the only sound line of treatment is to re-open the abdomen, search for the adherent coil of intestine, and set it free.

#### PERFORATION OF THE BOWEL AND FÆCAL FISTULA.

Perforation is one of the gravest disasters of abdominal surgery. It is an extremely fatal complication; and usually the patient's only chance of recovery depends on the formation of a fæcal fistula—a loathsome condition.

##### *Modes of Production.*—

1. In cases where the bowel is adherent to the peritoneum of the anterior abdominal wall, the surgeon may wound the bowel in opening the abdomen. This is most apt to occur in those cases where a second abdominal section is being performed, and the incision is made in the line of the old scar.

## 42 *After-Treatment of Cases of Abdominal Section.*

2. In separating adherent intestines from ovarian tumours and suppurating Fallopian tubes, the surgeon may tear a hole in the bowel; or he may so damage its coat that perforation occurs some days later. This accident may even occur where only the peritoneum has been detached from a patch of intestine. In those cases where before the operation a suppurating ovary or tube has been discharging directly into the bowel, it is impossible to remove the diseased organ without leaving a hole in the intestine.

3. Where the surgeon has included a piece of bowel in one of the sutures closing the abdomen, the patient may succumb either to intestinal obstruction or perforation. Should she run the gauntlet of both these dangers, a fæcal fistula is almost certain to form opposite the offending stitch.

4. In cases where the abdomen has been opened and drained for tubercular peritonitis, there is a peculiar tendency for a fæcal fistula to form, probably from perforation of a tubercular patch in the intestine.

5. After certain operations on the intestine itself (such as enterectomy and intestinal anastomosis), one or more of the stitches may give way and perforation occur. After operation for perityphlitic abscess and recurrent appendicitis, a fæcal fistula frequently results.

6. In a few cases the drainage tube is to blame. If it be an indiarubber tube, the sharp edges of the lateral openings and of the lower end are apt, especially in children, to saw through the intestinal wall and cause perforation. If an open-ended glass tube be used, and injurious long-continued pressure be made on it by a tight binder, the lower end may punch a hole in the rectum.

*Clinical Features.*—Where a perforation of the intestine into the peritoneal cavity occurs, the patient suddenly complains of great pain, rapidly becomes collapsed, and dies of acute peritonitis. In less severe cases the first sign of the formation of a fæcal fistula is usually the escape of flatus through the drainage tube. Soon a foul-smelling brownish fluid discharges through

the tube, and, later, typical intestinal contents. If the portion of bowel affected be the lower half of the colon, the discharge has the pultaceous consistence, brown colour, and familiar odour of ordinary fæces. But if it come from the small intestine, it is a bright yellow frothy fluid, almost odourless, and containing particles of half-digested food. It has marked digestive powers, and rapidly eats away the epithelium of the skin of the abdomen for several inches round the wound. I have seen such a fistula convert the skin of the whole front of the abdomen into a raw, bleeding, granulating surface. In some cases the whole of the intestinal contents pass out through the wound; in others, there is only a narrow sinus, through which occasionally a little flatus or fæcal matter escapes. When the small intestine has been opened high up and the whole contents are discharged, the patient rapidly emaciates, and dies of marasmus.

*Treatment.*—

1. Should the surgeon unfortunately wound a coil of intestine during the operation, he should bring it into the wound and close the opening with Lembert sutures. If the rent be a very large one, and the intestinal coat diseased, he should sew the opening in the bowel to the abdominal wound, and make an artificial anus, to be closed at a later date.

2. If a hole be torn in the rectum low down in the pelvis the surgeon must endeavour to prevent infection of the general peritoneal cavity. He has the choice of three procedures:—

- (a.) He may pass a large open-ended glass drainage-tube down to the bottom of the pouch of Douglas, keep the patient rigidly on her back, and under the influence of opium. For several days as little food as possible should be given. Purgatives and enemata must be avoided as poison. If no fæces escape for twenty-four hours the track of the drainage-tube becomes shut off from the general peritoneal cavity, and the patient will probably escape the danger of peritonitis. The fæcal fistula, which forms slowly, contracts and heals—but it is a long and weary process.

#### 44 *After-Treatment of Cases of Abdominal Section.*

(b.) He may plug the pouch of Douglas with a firm column of iodoform gauze brought out through the lower angle of the wound. This gauze is left in situ for five days. It mechanically closes the rent in the bowel and interposes an antiseptic barrier between it and the rest of the peritoneum. After the removal of the gauze, as a rule, a fæcal fistula remains.

(c.) In addition, the surgeon may perform colotomy to divert the current of fæces from the rectum until the rent has healed.

Whenever a fæcal fistula forms it should be kept as clean and dry as possible. The lips of the wound should be smeared with boracic ointment, and an absorbent dressing applied and frequently changed. If possible, the patient should be kept in bed until it is healed. When the fistula is high up in the small intestine and the patient is emaciating, peptonised nutrient enemata and suppositories should be administered in addition to plenty of easily digested highly nutritious food by the mouth.

At a later date attempts must be made to close the opening. If it be small and the quantity of fæcal discharge scanty, the repeated application of Paquelin's cautery will sometimes suffice to cause its obliteration. If this fails a plastic operation should be performed, the mouth of the opening being rawed by denudation or flap splitting and closed with silkworm gut sutures. If this and similar proceedings are likewise unsuccessful then, as a last resource, the abdomen may be reopened, the adherent bowel separated from the abdominal wall, the edges of the opening in the gut freshened, inverted, and brought together with Lembert sutures. This is a risky operation and only a skilled surgeon should attempt it.

#### STITCH ABSCESES.

This is a minor complication that more often troubles the abdominal than the general surgeon. It is *predisposed* to by several conditions:—

1. The abdominal wall is never at rest: it is constantly moving with the act of respiration.
2. If there be vomiting or coughing, with every act the stitches are violently dragged on.

3. If there be tympanites, the stitches are subjected to an increasing continuous strain.

4. Fat florid patients are more subject to them than thin anæmic ones.

5. The surgeon may have tied his stitches too tightly.

But whilst these conditions predispose to the formation of stitch abscess the *exciting cause* is nearly always *dirt*.—

1. The needle carrying the sutures may be dirty and infect the track.

2. The skin pierced may be dirty, and then particles of germ-laden epithelium are dragged in with the suture.

3. The material used for the suture may be dirty. Probably nine out of ten stitch abscesses are due to this cause. The best material for suturing the abdominal wound is undoubtedly silkworm gut. It is easily rendered aseptic; it is pliable, easily tied, absolutely non-irritating to the tissues, and is easily removed. It may be left in situ for weeks without causing suppuration. Silk acts like a wick and becomes soaked with blood. If the silk be not perfectly aseptic, this blood undergoes putrefactive changes and acts as an irritant all along the track of the suture—in fact, the suture becomes a seton. Even if aseptic silk be used, but the surface of the wound be not kept surgically clean, the superficial portion of the suture becomes infected, and this in turn contaminates the rest. The sutures just above or below a necrosing hysterectomy stump or a drainage-tube through which offensive discharge escapes, are almost certain to suppurate.

*Symptoms, etc.*—About the third or fourth day a small hard tender swelling, about as large as a hazel nut, forms around each of the infected stitches. The skin becomes hard and brawny and finally red and inflamed. On pressure, pus oozes out alongside the stitch. There is often a moderate degree of fever.

*Treatment.*—This consists in the early removal of the offending suture to allow of the escape of the pus. A boracic lint poultice should then be applied to the wound.

## RUPTURE OF THE WOUND.

This terrible accident is fortunately exceedingly rare. It is *predisposed* to by anything which interferes with the union of the abdominal wound—by sepsis and suppuration. Cases of hysterectomy for myoma (where the pedicle has been clamped, and the lower portion of the wound is filled with a mass of necrosing tissue) are specially liable to it. When the slough separates, there is left a chasm separated often only by a thin partition of tissue from the general peritoneal cavity. Too early removal of the stitches may also predispose to rupture.

The *exciting cause* is always some muscular effort, such as straining at stool, vomiting, or coughing. The wound suddenly bursts open, and the intestines escape. This accident is nearly always fatal, from acute peritonitis, particularly if the wound at the time be in a septic condition.

*Treatment.*—

1. Wash the extruded bowels with some warm, weak, antiseptic solution (such as boracic acid), and cover with a moist, clean, warm compress or flat sponge.
2. Thoroughly disinfect the wound and its surroundings.
3. Gently return the bowels to the abdominal cavity, taking out one or more stitches if necessary.
4. Irrigate the peritoneal cavity, and sponge it clean. Insert a drainage tube, and close the wound with fresh sutures.

## PAROTITIS.

This curious complication usually occurs during the second or third week after the operation, and may nearly always be traced to a septic cause. It is characterised by a painful brawny swelling of the parotid, and often submaxillary glands. One side is first attacked, and a few days later the other follows suit. The mouth cannot be opened, nor can the head be rotated on the neck without distress, and speech and deglutition become difficult and painful. There is general febrile disturbance, anorexia, and a furred tongue. The inflammation is apt to go on to suppuration, the occurrence of which is indicated by

œdema of the skin, rigors, high fever, and later by deep-seated fluctuation. The pus often discharges through the ear.

*Treatment.*—A free saline purge should be given at the onset, the inflamed area painted with belladonna and glycerine, and the head and face wrapped in cotton wool. A hot poultice will give relief if there be much pain. Brandy, egg flip, and liberal doses of cinchona should be administered. Should suppuration occur, the pus must be evacuated by one or more horizontal incisions anterior to a vertical line crossing the angle of the lower jaw.

*Prognosis.*—This should be guarded, as not infrequently suppurative parotitis is the first manifestation of pyæmia. Its occurrence, therefore, should always direct the surgeon's attention to the field of operation, and if there be a focus of infection, this must be vigorously dealt with.

#### SURGICAL RASHES.

A common but harmless complication is the occurrence sometime during the first ten days after the operation of a copious cutaneous eruption. I have observed four types :—

1. Typical urticaria—raised wheals with white crests and red bases.
2. Small red raised discrete papules, the size of mustard seeds, with a pale pink field between.
3. Irregular dusky red blotches, not unlike those of measles.
4. A uniform vivid scarlet blush resembling that of scarlatina.

The rash may attack any part, but the favourite sites are the extensor aspects of the elbows, forearms, hands and knees, the face and front of the chest. It is often curiously symmetrical in its distribution and erratic in its course—suddenly disappearing from one area to invade another. The patient frequently complains of itching and tingling, but otherwise feels well. As a rule there is no fever, no sore throat, headache, or malaise. Occasionally, however, the attack closely resembles a mild scarlatina. The rash lasts from one to four days. As it is fading



#### 48 *After-Treatment of Cases of Abdominal Section.*

the area of skin affected often acquires a yellowish tint. Where the rash has been very vivid and copious it is generally followed by a branny desquamation.

*Causation.*—These rashes are not peculiar to any particular class of abdominal operation, occurring with equal frequency after nephrectomy, ovariectomy, hysterectomy, and exploratory incisions. They may occasionally be due to certain articles of diet (such as fish) or to certain drugs (such as iodoform, carbolic acid), or the use of turpentine enemata, but on the other hand they occur where none of these have been given. Nor are these rashes, in the ordinary sense of the word, septic. As a rule, they occur in patients who otherwise recover without a bad symptom. There is, however, evidence to shew that they are infectious from one patient to another. I have seen the eruption attack four patients consecutively occupying the same bed in hospital.

*Treatment.*—If the tongue be furred and the bowels confined, a saline purgative should be given. Otherwise, no special treatment is indicated.

#### VENTRAL HERNIA.

One of the occasional remote results of an abdominal section is the formation of a ventral hernia, the protrusion occurring at the weakest point of the cicatrix. Let me briefly indicate the more important causes :—

1. It is more apt to follow hysterectomy for myoma than any other operation.

2. It is predisposed to by a long abdominal incision, the prolonged use of the drainage tube, and the occurrence of prolonged suppuration in the wound.

3. The exciting cause is usually some severe muscular effort, such as straining at stool, vomiting, coughing, or lifting some heavy weight.

4. If the patient discard her belt too soon, or if the belt be an ill-fitting one, a hernia is liable to form.



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